

Amendments to the Claims

The listing of claims below is intended to replace all prior listings of the claims:

1. (Currently Amended) A method of detecting a neurodegenerative disease in a mammal comprising:

activating brain tissue of the mammal by application of radiation from a laser through an opening or a thinned portion of the mammal's skull under conditions effective to promote a simultaneous multiphoton excitation of the brain tissue and to emit a fluorescence characteristic, wherein the radiation is at an intensity level capable of being achieved by a titanium sapphire mode locked solid state laser and has a wavelength in the visible red to the infrared region of the light spectrum and is pulsed at a pulse width between about 10^{-9} to 10^{-15} second, said fluorescence characteristic being achieved by combining photons;

comparing the fluorescence characteristic to a standard fluorescence emitted by exciting healthy brain tissue of the mammal under the same conditions used to carryout said activating; and

identifying the brain tissue where the fluorescence characteristic differs from the standard fluorescence as potentially having a neurodegenerative disease.

2. (Original) The method according to claim 1 further comprising:
treating the brain tissue with at least one photo-active agent prior to said activating.

3. (Original) The method according to claim 2, wherein the standard fluorescence is determined prior to said treating the brain tissue with at least one photo-active agent.

4. (Original) The method according to claim 2, wherein the photo-active agent fluoresces upon binding to lesions of neurodegenerative disease or other neuroanomalies.

5-7. (Canceled)

8. (Currently Amended) The method according to claim 1 [[5]], wherein the laser is a mode-locked laser.

9. (Original) The method according to claim 1 further comprising:
collecting radiation applied to the brain tissue.

10. (Previously Presented) The method according to claim 1, wherein said identifying is carried out under conditions effective to determine whether the mammal has a neurodegenerative disease selected from the group consisting of Alzheimer's Disease, Parkinson's Disease, Huntington's Disease, and Lou Gehrig's Disease.

11. (Previously Presented) The method according to claim 10, wherein said identifying is carried out under conditions effective to determine whether the mammal has Alzheimer's Disease.

12. (Original) The method according to claim 11, wherein amyloid plaques are detected in the brain of the mammal.

13. (Original) The method according to claim 11, wherein neurofibrillary tangles are detected in the brain of the mammal.

14. (Original) The method according to claim 1, wherein the method is carried out *in vivo*.

15. (Canceled)

16. (Previously Presented) The method according to claim 1, wherein the radiation is passed through a portion of the skull of the mammal which has been thinned.

17. (Canceled)

18. (Original) The method according to claim 1, wherein the fluorescence characteristic is an autofluorescence characteristic.

19. (Currently Amended) A method of producing an image of brain tissue from a mammal comprising:

activating brain tissue of a mammal with radiation applied from a laser through an opening or a thinned portion of the mammal's skull under conditions effective to promote a simultaneous multiphoton excitation of the brain tissue and to produce a fluorescence, wherein the radiation is at an intensity level capable of being achieved by a titanium sapphire mode locked solid state laser and has a wavelength in the visible red to the infrared region of the light spectrum and is pulsed at a pulse width between about 10^{-9} to 10^{-15} second, said fluorescence being achieved by combining photons and

collecting the fluorescence to produce an image of the brain tissue.

20. (Original) The method according to claim 19 further comprising:
treating the brain tissue with at least one photo-active agent prior to said activating.

21-23. (Canceled)

24. (Currently Amended) The method according to claim 19 [[21]], wherein the laser is a mode-locked laser.

25. (Previously Presented) The method according to claim 19, wherein the method is carried out on brain tissue affected with a neurodegenerative disease, whereby said collecting produces an image of the brain tissue affected with a neurodegenerative disease.

26. (Previously Presented) The method according to claim 25, wherein said collecting is carried out under conditions effective to produce an image of the brain tissue affected with a neurodegenerative disease selected from the group consisting of Alzheimer's Disease, Parkinson's Disease, Huntington's Disease, and Lou Gehrig's Disease.

27. (Previously Presented) The method according to claim 26, wherein said collecting is carried out under conditions effective to produce an image of the brain tissue affected with Alzheimer's Disease.

28. (Original) The method according to claim 27, wherein amyloid plaques are imaged in the brain of the mammal.

29. (Original) The method according to claim 27, wherein neurofibrillary tangles are detected in the brain of the mammal.

30. (Original) The method according to claim 19, wherein the method is carried out *in vivo*.

31. (Canceled)

32. (Previously Presented) The method according to claim 19, wherein the radiation is passed through a portion of the skull of the mammal which has been thinned.

33. (Canceled)

34. (Original) The method according to claim 19, wherein the fluorescence is autofluorescence.

35. (Canceled)

36. (Previously Presented) The method according to claim 1, wherein the radiation has a wavelength of about 700 nm to about 1000 nm.

37. (Canceled)

38. (Previously Presented) The method according to claim 19, wherein the radiation has a wavelength of about 700 nm to about 1000 nm.

39. (Previously Presented) The method according to claim 1, wherein the radiation is applied through an opening of the mammal's skull.

40. (Previously Presented) The method according to claim 19, wherein the radiation is applied through an opening of the mammal's skull.